DETAILED ACTION

Claim Objections

1. **Claims 1, 8, 19, 21, and 33** are objected to because of the following informalities:

Independent Claim 1 line 9 recites limitation “the surround sound system”. There is insufficient antecedent basis for this limitation in the claim. For purpose of examination, examiner interprets “the surround sound system” in Independent Claim 1 as “a surround sound system”. In addition, dependent Claim 33 line 2 recites limitation “a surround sound system”. For purpose of examination, examiner interprets “a surround sound system” in dependent Claim 33 as “the surround sound system”.

Dependent Claim 8 line 3 recites limitation “at least one of the reflections”, and independent Claim 1 line 6 recites limitation “at least one reflection of the emitted signals”. It is unclear if applicants intend to claim “at least one of the reflections” in dependent Claim 8 other than “at least one reflection of the emitted signals” in independent Claim 1. For purpose of examination, examiner interprets “at least one of the reflections” in dependent Claim 8 as “the at least one of the reflections”.

Claim 19 recites the limitation “said array of electro-acoustic transducers” in lines 2-3. There is insufficient antecedent basis for this limitation in the claim. For purpose of examination, examiner interprets this limitation as “an array of electro-acoustic transducers”. Although the dependency of Claim 19 is changed to Claim 8; however, limitation “array of electro-acoustic transducers” could not be found in Claim 8 (it is found in Claim 3 instead).

Dependent Claim 21 line 2 recites limitation “registered reflected signals”, and independent Claim 1 line 8 recites limitation “the registered reflected signals”. For purpose of examination, examiner interprets “registered reflected signals” in dependent Claim 21 as “the registered reflected signals”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-24, 27-28, 33, 37-44, and 48** are rejected under 35 U.S.C. 102(b) as being anticipated by Hooley et al. WO 01/23104 (hereinafter, "Hooley"), cited by Applicants in IDS filed on 06/22/05.

Regarding **claim 1,** Hooley teaches *a set-up method for a loudspeaker system capable of generating at least one directed beam of audio sound, the loudspeaker system being in a room* (normal room environment, page 42, lines 6-11)*, the room comprising a listening position* (see Fig. 21; listening room, page 45, lines 3-8, lines 25-26; page 62, lines 18-30), *the method comprising the steps of*:

emitting directional beam of set up sound signals (where those focused regions are directed at one or more of the reflecting boundary surfaces, page 42, lines 6-11; see also Digital Phased-Array Antennae, page 13, lines 3-8) *from the loudspeaker system into the room* (room environment, page 42, lines 6-11; Fig. 27, page 50, lines 18-25; listening room, page 45, lines 3-8; page 58, lines 10-12);

registering at least one reflection of the emitted signal (a microphone is used to measure the sound at the position of interest, i.e., *registering* by microphone, see page 38, lines 19-22; observer, listener 2103, see Fig. 21; his normal directional sound perception, see page 42, lines 6-15) *at one or more locations within the room* (directing different channels of sound in different directions so that the sound waves impinge on a reflective or resonant surface and are re-transmitted thereby, see page 41, lines 11-16, see Fig. 21, reflecting, page 43, lines 3-6; to appear to come from a wall,

page 58, lines 10-12; also, this third aspect of the invention can be used in conjunction with the second aspect of the invention to provide that anti-beams, see page 43, lines 12-14; listening area is adversely affected by reflections off walls or other boundaries, see page 39, lines 19-22);

evaluating the registered signals (by controller 2002, see Fig. 20, page 38, lines 22-27; see Fig. 21, page 42, lines 6-11) *to obtain data for use in configuring the surround sound system* (see page 41, lines 11-15; the surround sound effect is audible throughout the listening area, see page 43, lines 3-6; ensure that only the correct channels have significant energy at the respective reflective surface, page 43, lines 17-19; the parameters of each of the parts of each Distributor can be varied under User or automatic control, see Fig. 8, page 26, lines 14-18; model optimizing, has been discussed in second aspect, page 45, lines 3-15; the control system then computes the optimum array parameters to locate a focused or directed beam at the position of the microphone, i.e., thereafter, see page 47, lines 2-9).

Hooley thus teaches all the claimed limitation.

Regarding **claim 2,** Hooley teaches the method of claim 1, further comprising: using the directing parameters to direct the beam of audio sound into a desired direction (thereafter the microphone may be removed; the separate remote sound source will then emanate from the surface at the chosen location, see page 47, lines 2-9).

Regarding **claim 3,** Hooley teaches the method of claim 1, wherein the loudspeaker system comprises an array of electro-acoustic transducers (page 13, lines 3-8).

Regarding **claim 4,** Hooley teaches the method of claim 3, wherein each signal is emitted from a single electro-acoustic transducer in the array (page 13, lines 3-8).

Regarding **claim 5,** Hooley teaches the method of claim 3, wherein each signal is emitted from a plurality of electro-acoustic transducers in the array so that the signal is emitted in a desired direction (if desired, steer in the direction at right angles to each plane, see page 15, lines 4-7).

Regarding **claim 6,** Hooley teaches the method of claim 3, wherein different signals are simultaneously emitted from different electro-acoustic transducers (i.e., if multiple sources are used simultaneously, page 53, lines 13-17; multiple simultaneous beams, page 62, lines 24-25; see Fig. 22).

Regarding **claim 7,** Hooley teaches the method of claim 6, wherein the different electro-acoustic transducers are located at one or both of an edge position and the centre of the transducer array (see path 2206, Fig. 22, for triangulation, page 46, lines 1-5).

Regarding **claim 8,** Hooley teaches the method of claim 1, *wherein the registering includes positioning at least one microphone in the room and recording the least one of the reflections* (by microphone 2201, see Fig. 22, page 45, line 25 – page 46, line 5) *using the at least one microphone* (directing different channels of sound in different directions so that the sound waves impinge on a reflective or resonant surface and are re-transmitted thereby, see page 41, lines 11-16; see Fig. 21, reflecting, page 43, lines 3-6; to appear to come from a wall, page 58, lines 10-12; focusing a beam of sound energy onto a suitable reflecting surface, the use of the microphones previously described allows a simple way to set up this situation, see page 46, line 29 – page 47, line 9).

Regarding **claim 9,** Hooley teaches the method of claim 8, *wherein the at least one microphone comprises a plurality of microphones arranged in a known geometric configuration* (sonic electroacoustic transducers or SETs arranged in two-dimensional array, see page 13, lines 3-8; with triangular section SETs which tiles on the plane, see page 13, lines 15-18; where sections do not tile the plane, a close approximation to a filled aperture may be achieved by making the array in the form of a stack or arrays - i.e., three-dimensional, see page 13, lines 18-23).

Regarding **claim 10,** Hooley teaches the method of claim 8, *wherein the at least one microphone is physically positioned in or on the loudspeaker system* (i.e., one or

more of the microphones may be embedded in the handset, i.e., a component of the loudspeaker system; see page 44, lines 29-30).

Regarding **claim 11,** Hooley teaches the method of claim 1, *wherein the evaluating includes of determining the listening position relative to a location of the loudspeaker system* (allows reproduction of multi-channel surround sound, see page 62, lines 19-22).

Regarding **claim 12,** Hooley teaches the method of claim 1, *wherein the evaluating includes identifying multiple acoustic paths to the listening position* (allows reproduction of multi-channel surround sound, see page 62, lines 19-22).

Regarding **claim 13,** Hooley teaches the method of claim 12, *wherein the evaluating further includes assigning different audio channels to different paths* (allows reproduction of multi-channel surround sound, see page 62, lines 19-22).

Regarding **claim 14,** Hooley teaches the method of claim 1, wherein the evaluating includes identifying clusters of reflections in the registered reflected signals (by creating “dead zones”, page 45, lines 9-14).

Regarding **claim 15,** Hooley teaches the method of claim 1, further comprising using pre-known data relating to the geometry of the room (from architectural system,

page 61, lines 20-22) to exclude beam directions (at undesired reflecting surfaces, creating “dead zones”, page 45, lines 9-14).

Regarding **claim 16,** Hooley teaches the method of claim 15, wherein the pre-known data are provided by a human operator the method further including prompting for the input of the pre-known data (manual user input, see page 45, lines 9-14; page 61, lines 21-23).

Regarding **claim 17,** Hooley teaches the method of claim 15, wherein the pre-known data are provided by a previous application of a set-up method (thereafter the microphone may be removed; the separate remote sound source will then emanate from the surface at the chosen location; page 47, lines 7-9).

Regarding **claim 18,** Hooley teaches the method of claim 1, wherein the evaluating comprises recording the time elapsed between emitting the signals and receiving a first reflection at a location within the room (see Figs. 24, 25A-25F; page 48, lines 4-15).

Regarding **claim 19,** Hooley teaches the method of claim 8. Hooley further teaches wherein the at least one microphone is positioned at or near the plane of an array of electro acoustic transducers (see page 6, lines 16-18; vicinity, page 43, lines 28-30).

Regarding **claim 20,** Hooley teaches the method of claim 1, wherein the evaluating comprises determining the distance of surfaces from the loudspeaker system (i.e., relative position, see page 103, lines 21-23) by scanning set-up sound beams around the room (beam steering, see page 102, lines 28-29; see also page 42, lines 23-29; page 46, line 29 - page 47, line 9; this optimization can occur either at set-up time - for instance during pre-performance use of the DPAA - or during actual use, see page 44, lines 26-30).

Regarding **claim 21,** Hooley teaches the method of claim 1, wherein only a first predetermined portion of the registered reflected signals received are evaluated in the evaluating step (low amplitude, page 56, lines 12-16; echoes from reflecting surfaces, page 63, lines 1-3).

Regarding **claim 22,** Hooley teaches the method of claim 1, wherein the signals emitted from the loudspeaker system are focused using the loudspeaker system such that the focus point is near to an estimated reflection surface (page 31, lines 24-29).

Regarding **claim 23,** Hooley teaches the method of claim 22, further comprising using a feedback loop is used to provide that the beam focus tracks the estimated reflection surface position as the beam moves (page 42, lines 6-15).

Regarding **claim 24,** Hooley teaches the method of claim 1, wherein at least one of the registered reflected signals is multiplied by a phase shifted version of the emitted signal to which it corresponds so as to discriminate signals reflected by surfaces that lie a predetermined distance from the loudspeaker system (i.e., added to delayed input signal replicas being output, page 47, lines 17-19; onto reflecting surface, see page 46, line 29 – page 47, line 2).

Regarding **claim 27,** Hooley teaches the method of claim 1, wherein the evaluating includes determining the angle of reflective surfaces relative to the loudspeaker system by analyzing time of receipt of a plurality of reflections, each representing a first reflection of a corresponding emitted signal (i.e., the beam is angled by an amount dependent on the amount of systematic delay increase that was used, see page 30, lines 28-30; time between outputting each test signal and receiving it at the input transducer, page 75, lines 10-13; delay coefficient, page 63, lines 1-3; listening area is adversely affected by reflections off walls or other boundaries, anti-beams may be directed at those boundaries, see page 39, lines 19-22).

Regarding **claim 28,** Hooley teaches the method of claim 1, wherein the evaluating step includes determining the angle of reflective surfaces relative to the loudspeaker system by analyzing relative amplitude of a plurality of reflections, each representing a first reflection of a corresponding emitted signal (i.e., the beam is angled by an amount dependent on the amount of systematic delay increase that was used,

see page 30, lines 28-30; time between outputting each test signal and receiving it at the input transducer, page 75, lines 10-13; sound energy, page 63, lines 1-3; listening area is adversely affected by reflections off walls or other boundaries, anti-beams may be directed at those boundaries, see page 39, lines 19-22).

Regarding **claim 33,** Hooley teaches the method of claim 1, wherein the loudspeaker system is a surround sound system for playback of surround sound channels (page 60, lines 20-22).

Regarding **claim 37,** *Hooley teaches the surround sound system* (see Fig. 21, page 43, lines 3-6; page 19, lines 13-14), the system comprising:

means for emitting directional beams of set-up sound signals (2703, 2705, Fig. 27, page 50, lines 18-25, i.e., into DPAA);

means for registering at least one of reflections of the emitted signals at one or more locations within a room (by microphone 2201, see Fig. 22, page 45, line 25 – page 46, line 5; listening room, page 45, lines 3-8; page 58, lines 10-12; this third aspect of the invention can be used in conjunction with the second aspect of the invention to provide that anti-beams, see page 43, lines 12-14; e.g., a microphone is used to measure the sound at the position of interest, i.e., registering by microphone, see page 38, lines 19-22; listening area is adversely affected by reflections off walls or other boundaries, see page 39, lines 19-22; normal room environment, page 42, lines 6-11); and

means for evaluating the registered reflected signals to obtain data for use in configuring the surround sound system (by controller 2002, see Fig. 20, page 38, lines 22-27; model optimizing, has been discussed in second aspect, page 45, lines 3-15; the control system then computes the optimum array parameters to locate a focused or directed beam at the position of the microphone, i.e., thereafter, see page 47, lines 2-9; ensure that only the correct channels have significant energy at the respective reflective surface, page 43, lines 17-19; the parameters of each of the parts of each Distributor can be varied under User or automatic control, see Fig. 8, page 26, lines 14-18).

Regarding **claim 38,** Hooley teaches the system of claim 37, *wherein the means for evaluating comprises a signal processor that outputs time of first reflection of a emitted signal* (see Figs. 24, 25A-25F; page 48, lines 4-15) *and/or amplitude of the reflected signal relative to the corresponding emitted signal* (i.e., the beam is angled by an amount dependent on the amount of systematic delay increase that was used, see page 30, lines 28-30; time between outputting each test signal and receiving it at the input transducer, page 75, lines 10-13; sound energy, page 63, lines 1-3; listening area is adversely affected by reflections off walls or other boundaries, anti-beams may be directed at those boundaries, see page 39, lines 19-22).

Regarding **claim 39,** Hooley teaches the system of claim 37, *wherein the system is configured to firstly determine position of the major reflecting surfaces in the room*

(page 42, lines 6-15) *and thereafter to determine the directions in which the surround sound channels will be emitted* (if desired, steer in direction at right angles to each plane, see page 15, lines 4-7; page 62, lines 7-11).

Regarding **claim 40,** Hooley teaches the system of claim 37, wherein the system comprises an array of electro-acoustic output transducers (i.e., if multiple sources are used simultaneously, page 53, lines 13-17; multiple simultaneous beams, page 62, lines 24-25; see Fig. 22; sonic electroacoustic transducers or SETs 2205, see page 13, lines 3-8).

Regarding **claim 41,** Hooley teaches the system of claim 37, wherein the means for registering comprises at least one microphone (microphone 2201, see Fig. 22, page 45, line 25 – page 46, line 5).

Regarding **claim 42,** Hooley teaches the system of claim 40, wherein the at least one microphone is positioned in the surround sound system close to an array of output electro-acoustic transducers (see page 6, lines 16-18; vicinity, page 43, line 28 – page 44, line; i.e., if multiple sources are used simultaneously, page 53, lines 13-17; multiple simultaneous beams, page 62, lines 24-25; see Fig. 22; sonic electroacoustic transducers or SETs 2205, see page 13, lines 3-8).

Regarding **claim 43,** Hooley teaches the method of claim 1, wherein the registered reflected signals are evaluated to determine directing parameters for use in directing a future beam of audio sound (creating “dead-zones”, has been discussed in second aspect, page 45, lines 3-15)

Regarding **claim 44,** Hooley teaches the method of claim 43, wherein the emitted signals are also registered and evaluated to determine the directing parameters (model of the DPAA and its acoustic characteristic, reduce any troublesome side lobes, see page 45, lines 3-15).

Regarding **claim 48,** Hooley teaches *a surround sound system for a room* (see Fig. 21, page 43, lines 3-6; page 19, lines 13-14; normal room environment, page 42, lines 6-11) comprising:

one or more loudspeakers configured to emit directional beams of sound signals (where those focused regions are directed at one or more of the reflecting boundary surfaces, page 42, lines 6-11; Digital Phased-Array Antennae, page 13, lines 3-8);

controller electronics configured to control the loudspeakers to emit directional beams of set-up sound signals in different directions (controller 2002, see Fig. 20, page 38, lines 22-27; see Fig. 21, page 42, lines 6-11); and

a detector configured to detect reflections of the set-up sound signals (a microphone is used to measure the sound at the position of interest, i.e., *registering* by

microphone, see page 38, lines 19-22) *at one or more locations within the room* (directing different channels of sound in different directions so that the sound waves impinge on a reflective or resonant surface and are re-transmitted thereby, see page 41, lines 11-16, see Fig. 21, reflecting, page 43, lines 3-6; to appear to come from a wall, page 58, lines 10-12; also, this third aspect of the invention can be used in conjunction with the second aspect of the invention to provide that anti-beams, see page 43, lines 12-14; listening area is adversely affected by reflections off walls or other boundaries, see page 39, lines 19-22),

wherein the controller electronics is further configured to generate, based at least in part on the detected reflections, surround sound system configuration data usable in steering directional beams for surround sound channels (observer, listener 2103, see Fig. 21; his normal directional sound perception, see page 42, lines 6-15; see page 41, lines 11-15; the surround sound effect is audible throughout the listening area, see page 43, lines 3-6; ensure that only the correct channels have significant energy at the respective reflective surface, page 43, lines 17-19; the parameters of each of the parts of each Distributor can be varied under User or automatic control, see Fig. 8, page 26, lines 14-18; model optimizing, has been discussed in second aspect, page 45, lines 3-15; the control system then computes the optimum array parameters to locate a focused or directed beam at the position of the microphone, i.e., thereafter, see page 47, lines 2-9).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 29-32, 34-35, and 46** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hooley et al. WO 01/23104 (hereinafter, "Hooley", cited by Applicants in IDS filed on 06/22/05)

Regarding **claim 29,** Hooley teaches the method of claim 1, wherein the evaluating comprises analyzing a change in received first reflection signal amplitude and analysing a change in time of first reflection (Fig. 21, page 43, lines 3-7; time between outputting each test signal and receiving it at the input transducer, page 75, lines 10-13; sound energy, delay coefficient, page 63, lines 1-3).

However, Hooley does not explicitly specify to determine whether the reflecting surface is continuous, planar or curved.

Hooley further discloses positions where they are known to be undesired reflecting surfaces; creating "dead zones" (page 45, lines 9-14).

It would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have determined whether the reflecting surface is

continuous, planar or curved since there are a finite number of identified, predictable potential solutions of undesired reflecting surfaces (continuous, discontinuous, planar or curved) to the recognized need (i.e., evaluating) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

Regarding **claim 30,** Hooley teaches the method of claim 1. However, Hooley does not explicitly specify wherein the direction of signals emitted from the loudspeaker system is set to track detected discontinuities between reflective surfaces in the room.

Hooley further discloses reflecting surfaces (2101, Fig. 21, page 43, lines 3-7) of concert hall (page 42 lines 23-29); positions where they are known to be undesired reflecting surfaces, creating “dead zones” (page 45, lines 9-14).

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have included wherein the direction of signals emitted from the loudspeaker system is set to track detected discontinuities between reflective surfaces in the room since there are a finite number of identified, predictable potential solutions of undesired reflecting surfaces (continuous, discontinuous, planar or curved) to the recognized need (i.e., to track detected discontinuities) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

Regarding **claim 31,** Hooley teaches the method of claim 30. However, Hooley does not explicitly specify wherein the direction of signals emitted by the loudspeaker system is caused to veer to one side of an estimated discontinuity to confirm the presence of the discontinuity in the reflective surfaces.

Hooley further discloses reflecting surfaces (2101, Fig. 21, page 43, lines 3-7) of concert hall, directing beam at those surfaces (page 42 lines 23-29); positions where they are known to be undesired reflecting surfaces, creating “dead zones” (page 45, lines 9-14).

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have included wherein the direction of signals emitted by the loudspeaker system is caused to veer to one side of an estimated discontinuity to confirm the presence of the discontinuity in the reflective surfaces since there are a finite number of identified, predictable potential solutions of estimated discontinuity (directing the beam to the surface, off the surface) to the recognized need (i.e., estimating discontinuity) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

Regarding **claim 32,** Hooley teaches the method of claim 1. However, Hooley does not explicitly specify wherein the evaluating evaluates presence of a hole in a

room surface in a particular direction when no reflected signal is registered following an emission of a signal from the loudspeaker system and it is thereafter determined that audio sound signals are not directed towards the hole.

Hooley further discloses reflecting surfaces (2101, Fig. 21, page 43, lines 3-7) of concert hall, directing beam at those surfaces (page 42 lines 23-29); positions where they are known to be undesired reflecting surfaces, creating “dead zones” (page 45, lines 9-14).

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have included wherein the evaluating evaluates presence of a hole in a room surface in a particular direction when no reflected signal is registered following an emission of a signal from the loudspeaker system and it is thereafter determined that audio sound signals are not directed towards the hole since there are a finite number of identified, predictable potential solutions of evaluating the surface (receiving signal or no signal received) to the recognized need (i.e., evaluating) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

Regarding **claim 34,** Hooley teaches the method of claim 6. However, Hooley does not explicitly specify wherein the signals are emitted as spatially constrained beams of sound to a range of directions, the spatially constrained beams of sound being laterally constrained to form narrow vertical beams.

Hooley further discloses the amplitude control means (ACM) is conveniently implemented as digital amplitude control means for the purposes of gross beam shape modification (page 18, lines 18-20; page 22, lines 2-6); focus sound at point P (Fig. 16C; page 31, lines 18-29).

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have included wherein the signals are emitted as spatially constrained beams of sound to a range of directions, the spatially constrained beams of sound being laterally constrained to form narrow vertical beams since there are a finite number of identified, predictable potential solutions of shaping beams (constraining beam vertically, laterally) to the recognized need (i.e., constraining beams) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

Regarding **claim 35,** Hooley teaches the method of claim 34, wherein the spatially constrained beams of sound are laterally and vertically constrained to form narrow point or ellipsoidal beams focus sound at point P (Fig. 16C; page 31, lines 18-29).

Regarding **claim 46,** Hooley teaches the method of claim 19. Hooley further teaches wherein the at least one microphone is positioned at or near the plane of an

array of electro acoustic transducers (see page 6, lines 16-18; vicinity, page 43, lines 28-30).

However, Hooley does not explicitly specify the microphone is preferably positioned at the centre of the array.

Hooley further discloses microphone 2201 in Fig. 22 receives test signals from a small number of sonic electroacoustic transducers (SETs 2205) to deduce the microphone by triangulation (see page 45, line 25 - page 46, line 3). As shown in Fig. 22, the top right corner sonic electroacoustic transducers (2205) and bottom left corner sonic electroacoustic transducers (2205) are considered as an array; the array and microphone (2201) form a plane.

Therefore, it would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made, to position the microphone at center of the array since there are a finite number of identified, predictable potential solutions (i.e. off center, center) to the recognized need (i.e., positioning the microphone) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of achieving desired directional effect, as suggested by Hooley in page 13, line 8.

6. **Claim 45** is rejected under 35 U.S.C. 103(a) as being unpatentable over Hooley et al. WO 01/23104 (hereinafter, “Hooley”, cited by Applicants in IDS filed on 06/22/05), in view of Elko U.S. Patent 6041127.

Regarding **claim 45**, Hooley teaches the method of claim 9, wherein there are a plurality of microphones arranged in a known geometric configuration (sonic electroacoustic transducers or SETs arranged in two-dimensional array, see page 13, lines 3-8; with triangular section SETs which tiles on the plane, see page 13, lines 15-18; where sections do not tile the plane, a close approximation to a filled aperture may be achieved by making the array in the form of a stack or arrays - i.e., three-dimensional, see page 13, lines 18-23).

However, Hooley does not explicitly specify to preferably arrange a tetrahedral configuration.

Elko discloses a microphone array which provides a steerable and variable response pattern (col. 1, lines 6-10) in which one good geometric arrangement is to place the elements at the vertices of a regular tetrahedron (i.e., a three-dimensional geometric figure in which all sides are equilateral triangles), see col. 13, lines 30-36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the geometric arrangement taught by Elko with the set-up method for a loudspeaker system of Hooley such that preferably obtain a tetrahedral configuration as claimed for purpose of providing a steerable and variable response pattern, as suggested by Elko in column 1, lines 9-10.

7. **Claims 25-26, 47, and 49-50** are rejected under 35 U.S.C. 103(a) as being unpatentable over Hooley et al. WO 01/23104 (hereinafter, “Hooley”, cited by Applicants

in IDS filed on 06/22/05), in view of Lavoie et al. U.S. Patent Application Publication 20010038702 (hereinafter, "Lavoie", cited by Applicants).

Regarding **claim 25,** Hooley teaches the method of claim 1. However, Hooley does not explicitly disclose wherein at least one of the signals emitted by the loudspeaker system comprises a chirp signal.

Lavoie discloses a surround sound system allowing automatic calibration and adjustment of the frequency, amplitude and time response of each channel (para. [0002]) in which the test signal is a frequency sweep or chirp signal [0041].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the surround sound system taught by Lavoie with the set-up method for a loudspeaker system of Hooley such that wherein at least one of the signals emitted by the loudspeaker system comprises a chirp signal as claimed for purpose of creating a more interesting or realistic listening experience, as suggested by Lavoie in paragraph [0003].

Regarding **claim 26,** Hooley in view of Lavoie teaches the method of claim 25. Hooley in view of Lavoie, as modified, further teaches wherein a matched filter is used at the receiver to decode a reflected chirp signal so as to improve signal to noise ratio whilst maintaining adequate range-resolution (i.e., distinguishable using a correlation function, See Hooley, page 78, lines 7-9).

Regarding **claim 47,** Hooley in view of Lavoie teaches the method of claim 25.

However, Hooley in view of Lavoie does not explicitly disclose wherein the chirp signal reduces in frequency during its duration.

It would have been obvious to try, by one of ordinary skill in the art at the time of the invention was made to have included within the method of Hooley in view of Lavoie wherein the chirp signal reduces in frequency during its duration since there are a finite number of identified, predictable potential solutions of frequency during its duration (increasing or decreasing) to the recognized need (i.e., signal sweeping) and one of ordinary skill in the art could have pursued the known potential solutions with a reasonable expectation of success. The motivation is for purpose of creating a more interesting or realistic listening experience, as suggested by Lavoie in paragraph [0003].

Regarding **claim 49,** Hooley teaches the surround sound system according to claim 48. However, Hooley does not explicitly disclose wherein the controller electronics is configured to generate the surround sound configuration data based on earliest reflections of the set-up sound signals.

Lavoie discloses a surround sound system allowing automatic calibration and adjustment of the frequency, amplitude and time response of each channel (para. [0002]) including DSP (116, Fig. 11, see Lavoie [0064]) in which the response feature arriving with a delay of approximately 4.3 ms indicates a first reflected signal (i.e., earliest, see Lavoie, [0068]; Fig. 12(a)).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the surround sound system taught by Lavoie with the surround sound system of Hooley such that wherein the controller electronics is configured to generate the surround sound configuration data based on earliest reflections of the set-up sound signals as claimed for purpose of creating a more interesting or realistic listening experience, as suggested by Lavoie in paragraph [0003].

Regarding **claim 50,** Hooley teaches the surround sound system according to claim 48. Hooley discloses processor (1910, Fig. 19) transit time of each transducer (page 37, lines 23-30, see Hooley), location of the reflecting surface (page 42, lines 22-29, see Hooley).

However, Hooley does not explicitly disclose wherein a signal processor configured to determine time lapses between the emitting of set-up sound signals and the detecting of their respective earliest reflections by the detector, and amplitudes of the respective earliest reflections, and wherein the controller electronics is further configured to determine room shape based on the determined time lapses and amplitudes and to generate the surround sound system configuration data based on the determined room shape.

Lavoie discloses a surround sound system allowing automatic calibration and adjustment of the frequency, amplitude and time response of each channel (para. [0002]) including DSP (116, Fig. 11, see Lavoie [0064]) in which the time of flight delay of approximately 2.2 ms indicates that the distance between the microphone and the

speaker in this test was approximately 70 cm; the response feature arriving with a delay of approximately 4.3 ms indicates a first reflected signal (i.e., earliest, see Lavoie, Fig. 12(a), [0068]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the surround sound system taught by Lavoie with the surround sound system of Hooley such that the time delay of the first reflected signal indicates the distance between the microphone and the reflecting wall and thus to obtain the signal processor and the controller as claimed for purpose of creating a more interesting or realistic listening experience, as suggested by Lavoie in paragraph [0003].

Response to Arguments

8. Applicants' arguments with respect to claims 1-10 have been considered but are moot in view of the new grounds of rejection.

Regarding Applicants' arguments that "there is no disclosure of emitting directional beams (in Figure 22 one transducer only is used to emit each test signal) and there is no disclosure of registering at least one reflection (in Figure 22, only the direct sound is registered and no reflective surfaces are shown in Figure 22).", examiner respectfully disagrees since the test signal in Fig. 22 also has been discussed in second aspect (see Hooley page 45, lines 3-15); and third aspect of the invention can be used in conjunction with the second aspect, i.e., surround sound, reflecting surfaces, of the invention to provide that anti-beams (see Hooley page 43, lines 12-14).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CON P. TRAN whose telephone number is (571)272-7532. The examiner can normally be reached on M - F (08:30 AM - 05:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, VIVIAN C. CHIN can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CPT/
November 8, 2010

/VIVIAN CHIN/

Supervisory Patent Examiner, Art Unit 2614